

LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES



**OFFICE OF FISHERIES
INLAND FISHERIES SECTION**

**PART VI -B
WATERBODY MANAGEMENT PLAN SERIES**

CALCASIEU RIVER

**WATERBODY EVALUATION AND
RECOMMENDATIONS**

CHRONOLOGY

December 2012—Prepared by:

Eric Shanks, Biologist Manager, District 5

October 2014—Prepared by:

Eric Shanks, Biologist Manager, District 5

Remainder of this page intentionally left blank.

TABLE OF CONTENTS

WATERBODY EVALUATION.....	4
STRATEGY STATEMENT	4
Recreational	4
Commercial	4
Species of Special Concern	4
EXISTING HARVEST REGULATIONS	4
Recreational	4
Commercial	4
SPECIES EVALUATION.....	5
Recreational	5
Commercial	13
Species of Special Concern	13
HABITAT EVALUATION.....	13
CONDITION/IMBALANCE PROBLEM.....	15
CORRECTIVE ACTION NEEDED.....	16
RECOMMENDATIONS.....	16
REFERENCES	17

WATERBODY EVALUATION

STRATEGY STATEMENT

Recreational

Black basses, crappies and catfishes are managed in the Calcasieu River to provide sustainable populations of fish while giving anglers the greatest opportunity to catch and harvest a limit of fish. Sunfishes are managed to provide a sustainable population while providing anglers the opportunity to catch and harvest numbers of fish.

Commercial

Commercial species are managed with statewide regulations to provide a maximum sustainable yield that does not contribute to declines in future population strength.

Species of Special Concern

The following fish species are listed as species of conservation concern in the LDWF State Wildlife Action Plan (Lester et al. 2005):

Paddlefish, *Polyodon spathula*
Western Sand Darter, *Ammocrypta clara*
Bigscale Logperch, *Percina macrolepida*

Regulations for recreational harvest of paddlefish, *Polyodon spathula*, provide that two individual fish may be harvested if not exceeding 30 inches lower jaw – fork length. Paddlefish greater than 30 inches must be returned immediately to the water. Taking or possessing paddlefish in all saltwater areas of the state is prohibited. All possessed paddlefish must be dead. The possession and transportation of live paddlefish is prohibited. All paddlefish possessed on the waters of the state shall be maintained intact. No person shall possess paddlefish eggs on the waters of the state which are not fully attached to the fish. The commercial harvest of paddlefish is prohibited.

EXISTING HARVEST REGULATIONS

Recreational

Statewide regulations are in effect for all species. Current Louisiana fishing regulations can be found at: <http://www.wlf.louisiana.gov/regulations>

Commercial

Statewide regulations are in effect for all species. Current Louisiana commercial fishing regulations can be found at: <http://www.wlf.louisiana.gov/regulations>

Gill nets, seines, and trammel nets are prohibited below the Intracoastal Waterway (designated saltwater zone).

SPECIES EVALUATION

Recreational

Largemouth bass

Largemouth bass (LMB) are managed with statewide length and creel limits (see above), and make up over 90% of the population of black bass on the middle river section. LDWF standardized sampling for game fish occurs in this section, the results of which will be discussed below. Further upstream, as the river habitat changes, black bass populations gradually shift to predominately spotted bass.

Size distribution, relative weight and relative abundance

Length distributions generated from standardized sampling show the majority of LMB (84.6%) captured in the Calcasieu River were less than 11" total length (TL) as depicted in Figure 1. Mean relative weights (Wr) for most inch groups are greater than 90, indicating an adequate and available forage supply.

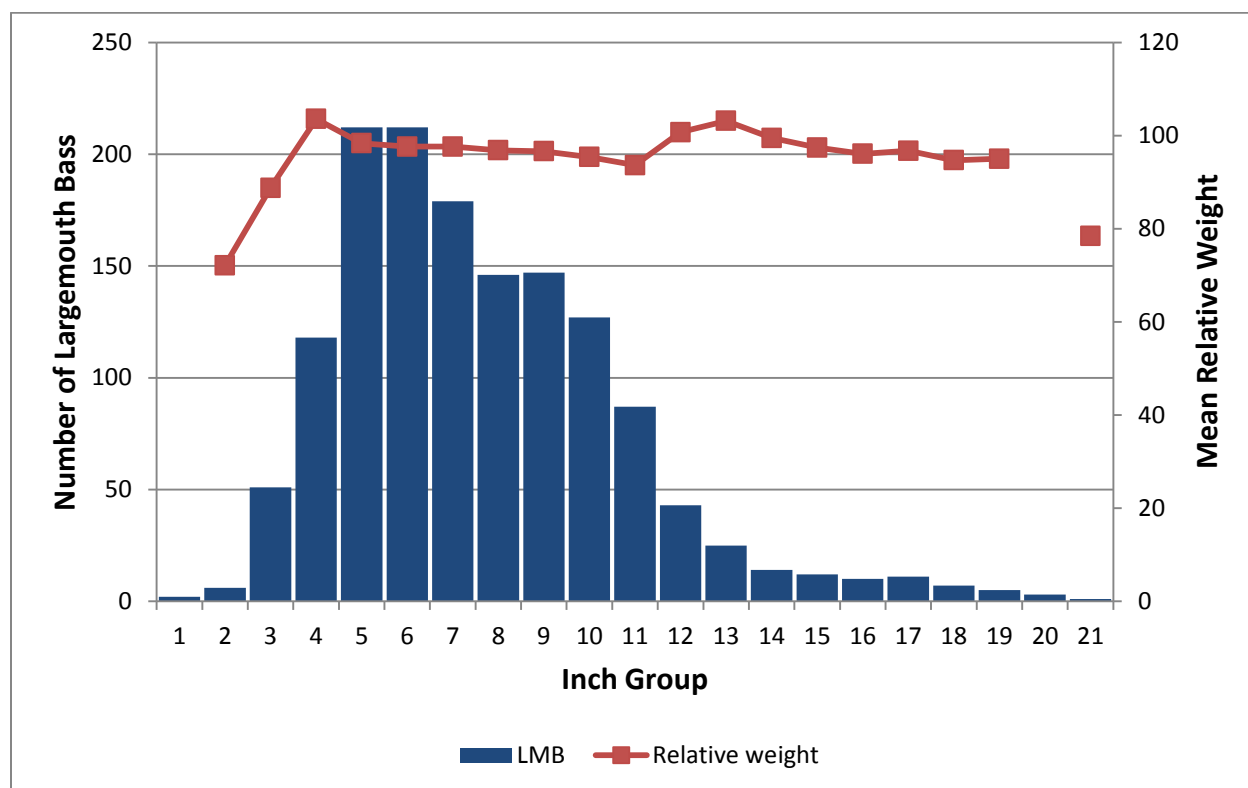


Figure 1. Size distribution and relative weight of largemouth bass generated from standardized electrofishing results for the Calcasieu River 2000-2014 (N=1,418). Mean relative weights generated from fall samples only (N=542).

Standardized spring electrofishing results (Figure 2) indicate a stable population in the 1990's, but lower relative abundance than the late 2000's. The low 2006 CPUE is a result of Hurricane Rita and its associated fish kill in fall of 2005. From 2007 to 2011 samples show increased relative abundance and greater variability, possibly due to hurricane related influence. Recent sampling (2012-2013) results show relative abundances similar to the 1990's.

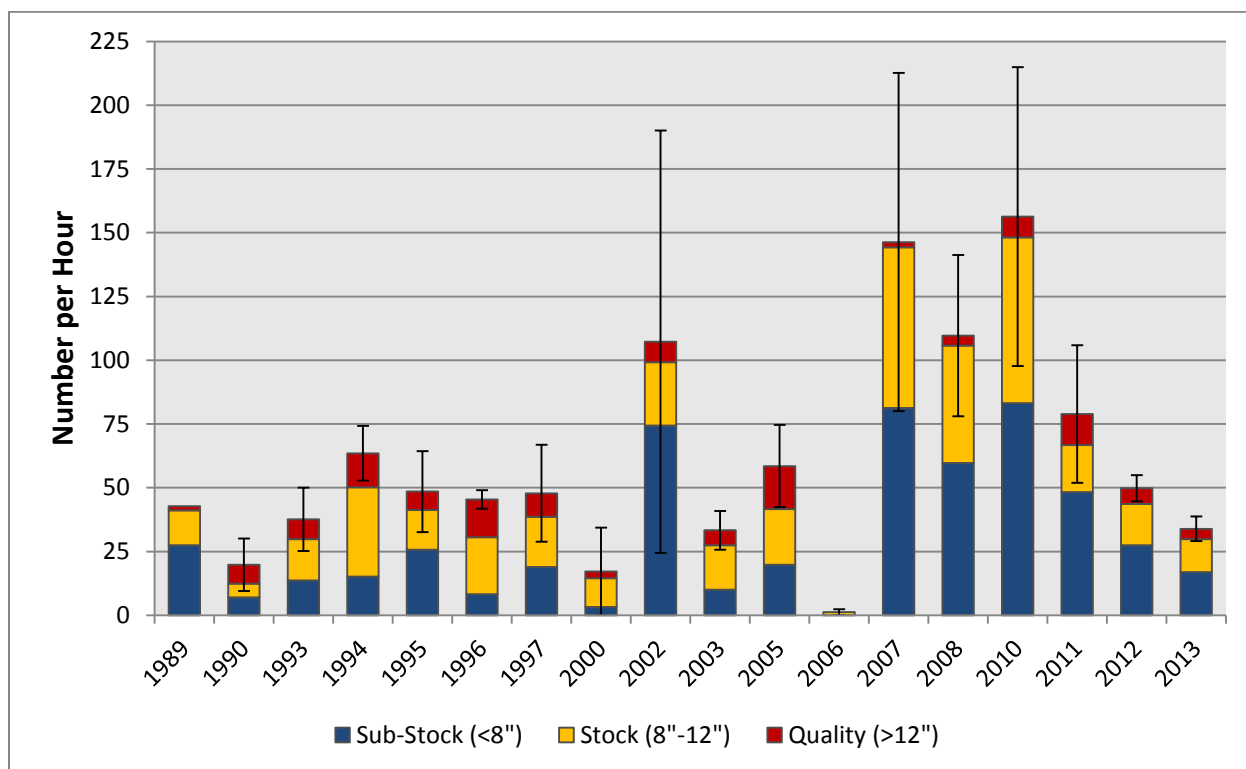


Figure 2. Annual mean CPUE (number per hour) for largemouth bass by size class from standardized spring electrofishing results 1989-2014. Error bars represent standard error of total mean CPUE.

Fall standardized electrofishing samples show high variability, reflecting natural fluctuations in recruitment and population (Figure 3). In fall 2005, no largemouth bass were captured after Hurricane Rita. Population recovery was rapid with record CPUE recorded (116.8 bass/hour) in fall of 2006. A small (13,206) number of northern strain LMB were stocked in spring 2006. No data is available on the success of this stocking, but it is unlikely that this stocking was responsible for the high recruitment recorded that year.

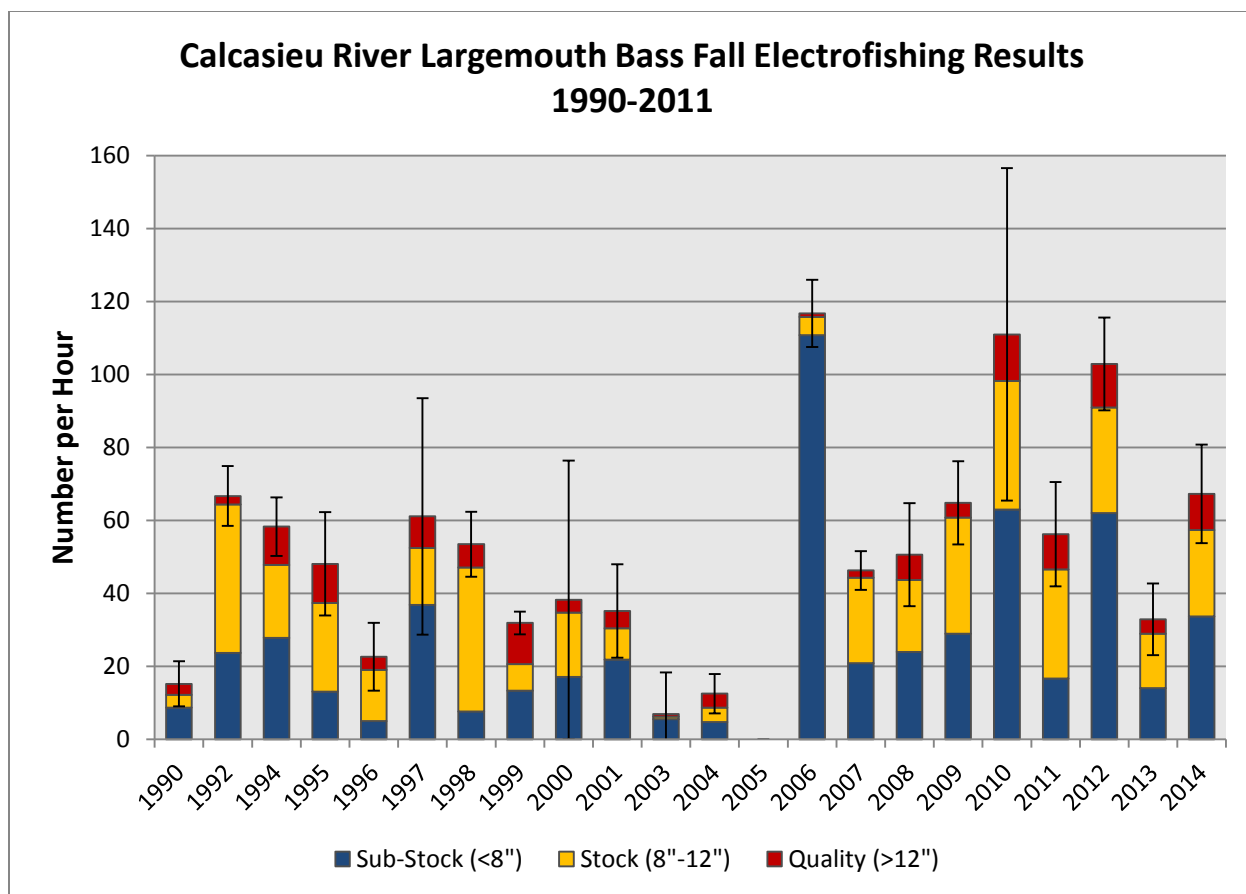


Figure 3. Annual mean CPUE (number per hour) for largemouth bass by size class from standardized fall electrofishing results from 1990-2014. Error bars represent standard error of total mean CPUE. Note the blank in 2005 represents no catch of largemouth bass in sample.

Age and growth

Age and growth samples were collected in 1990, 2000, and 2007. Because of the small sample sizes collected in 1990 and 2000 (N=28 and 29 respectively), no growth analyses are presented here. Due to the impact of Hurricane Rita, all fish collected in 2007 (n=44) were age 0 to 1. Because of this lack of older age classes, growth rates from this sample would not be representative of the “normal” age and growth composition for the Calcasieu River. A standardized age/growth/mortality assessment on largemouth bass was conducted from 2012-2014. Results of this study will be available in 2015.

Genetics

Genetic sampling of largemouth bass was conducted as part of the 2012-2014 standardized LMB assessment. Results are provided in Table 1.

Genetic analyses for largemouth bass from Calcasieu River, LA, 2012 – 2013.

Year	Number Sampled	Northern	Florida	Hybrid	Florida Influence
2012	131	87.8%	0%	12.2%	12.2%
2013	126	89.7%	0%	10.3%	10.3%

Spotted bass

In the middle section of the river, spotted bass make up less than 10% of the black bass population. As the river habitat upstream transitions to a shallower, sandy bottom, spotted bass become more abundant. Spotted bass comprise up to 90% of black bass populations in the upper river (Figure 4). Beginning in 2008, LDWF reduced river sampling efforts on the Calcasieu River in order to increase sampling effort on other rivers and streams in District 5. Sampling results after 2008 depict a more even distribution of bass species. This apparent change in species composition was a result of a decrease in sample sites in the upper reaches of the river. In 2014, no bass species were collected in seine sampling efforts on one reach of the upper river.

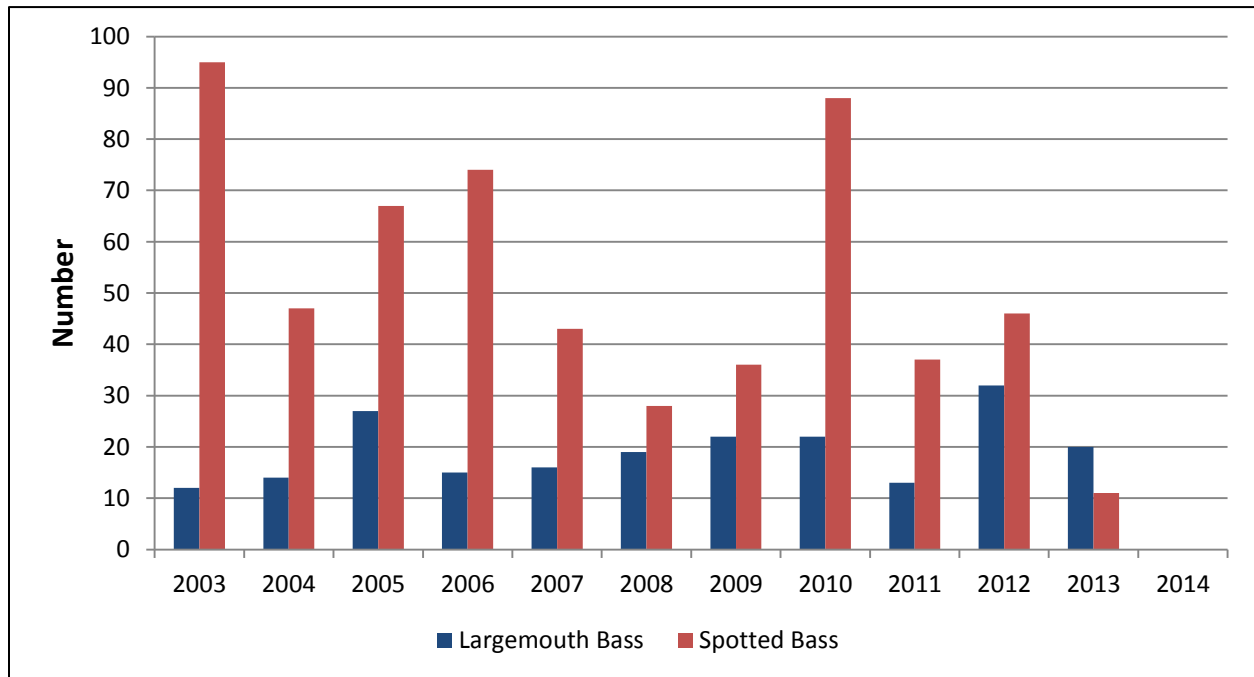


Figure 4. Largemouth bass and spotted bass captured in LDWF standardized big river sampling efforts on the upper Calcasieu River, LA, from 2003-2014 (N=784). Seines and electrofishing gears combined.

Forage

According to standardized electrofishing forage results, the most commonly available forage for largemouth bass in the Calcasieu River are *Lepomis spp.*, primarily bluegill and longear sunfish. Estuarine species such as bay anchovy (*Anchoa mitchilli*) and gulf menhaden (*Brevoortia patronus*) are also readily available forage items whose abundance varies with salinity. Other forage species found in the middle section of the river include freshwater silversides and juvenile spotted suckers. While sampling indicates that forage availability varies by year (Figure 5), this may be reflective of sampling bias since standardized forage sampling may not adequately sample pelagic species (shad, anchovies, and menhaden). In 2005, no forage species were collected as a direct result of fish kills associated with Hurricane Rita. In 2011, LDWF forage sampling protocols were changed to attempt to more accurately reflect forage availability by increasing sampling sites while decreasing sampling duration.

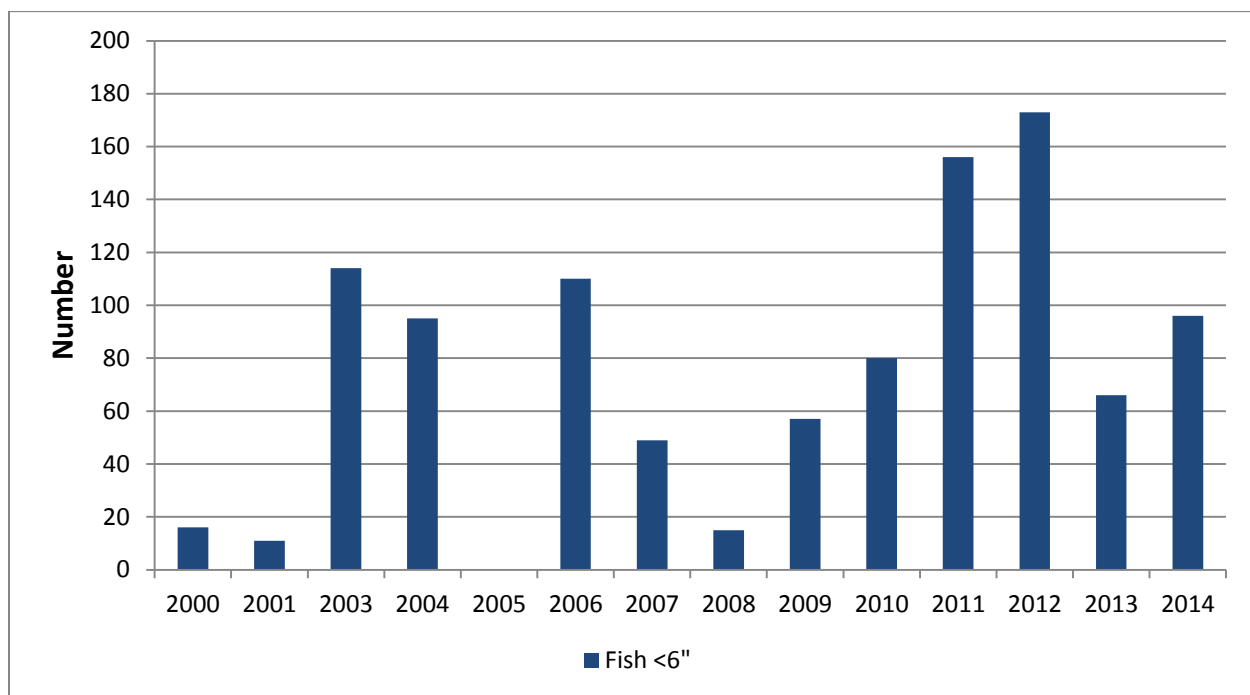


Figure 5. Number fish less than 6" total length (forage fish) collected in LDWF standardized electrofishing forage samples on the Calcasieu River from 2000-2014.

Crappie

Both black and white crappies are found in the Calcasieu River. Black crappies are more prevalent (Figure 6). No crappie-specific sampling has been conducted on the river.

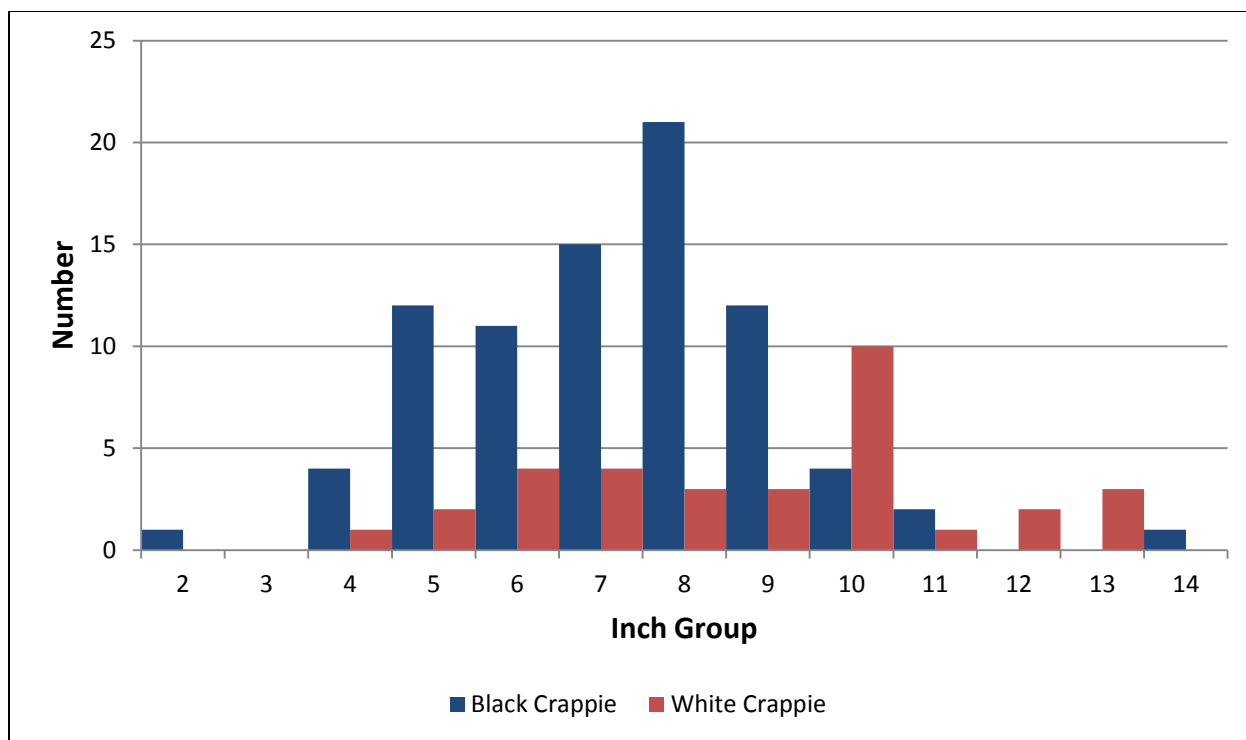


Figure 6. Black crappie and white crappie size distribution (inch groups) generated from standardized electrofishing results on the Calcasieu River, 1990-2014 (N=83 and 33, respectively).

Other Species— In 2002, LDWF initiated standardized big river sampling utilizing multiple gears to develop baseline data on the riverine fish species community. A total of 31,632 individuals were collected representing 81 species from August 2002 to August 2014 (Table 2).

Table 2. Fish species and total number collected in Calcasieu big river sampling efforts from August 2002-August 2014.

Species	Number	Species	Number
American Eel	1	Hybrid Striped Bass	2
Banded Pygmy Sunfish	1	Hybrid Sunfish	10
Bay Anchovy	150	Largemouth Bass	216
Big Scaled Logperch	26	Longear Sunfish	2373
Black Crappie	29	Longnose Gar	12
Blackside Darter	17	Marsh Killifish	13
Blackspot Shiner	11	Mimic Shiner	1293
Blackspotted Topminnow	755	Mud Darter	1
Blackstripe Topminnow	179	Orangespotted Sunfish	336
Blacktail Redhorse	133	Paddlefish	17
Blacktail Shiner	11928	Pallid Shiner	1431
Blue Catfish	29	Pirate Perch	4

Bluegill	693	Pugnose Minnow	39
Bluntnose Darter	72	Red Shiner	1
Bowfin	6	Redear Sunfish	23
Bream	18	Redfin Shiner	27
Brook Silverside	1242	Redspotted Sunfish	108
Brown Madtom	1	Ribbon Shiner	520
Bullhead	1	River Shrimp	23
Bullhead Minnow	3069	Sabine Shiner	323
Carp	4	Scaly Sand Darter	505
Chain Pickerel	1	Sea Catfish	1
Channel Catfish	52	Shortnose Gar	1
Crawfish	43	Silvery Minnow	217
Creole Darter	1	Skipjack Herring	1
Dollar Sunfish	46	Slough Darter	1
Dusky Darter	72	Smallmouth Buffalo	76
Emerald Shiner	111	Southern Brook Lamprey	1
Flathead Catfish	70	Speckled Chub	4
Flier	1	Spotted Bass	576
Freckled Madtom	2	Spotted Gar	34
Freshwater Drum	98	Spotted Sucker	668
Gizzard Shad	80	Striped Mullet	53
Golden Shiner	1	Tadpole Madtom	1
Golden Topminnow	2	Threadfin Shad	30
Grass Pickerel	7	Warmouth	43
Grass Shrimp	333	Weed Shiner	2834
Green Sunfish	16	Western Mosquitofish	431
Gulf Menhaden	1	White Crappie	65
Harlequin Darter	4	Yellow Bullhead	3
Hogchoker	9		

Creel Survey

In 2007 and 2013, recreational angler surveys (creel surveys) were conducted from January through December on the middle portion of the Calcasieu River to collect effort, catch, and harvest information, particularly for largemouth bass. The 2013 survey estimated that a total of 6,460 anglers utilized the Calcasieu River that year, of which 3,327 were bass anglers (51.5%) who expended approximately 12,035 hours of fishing effort. Using an estimated surface acreage of 2,800 acres (including Calcasieu West Fork), this works out to approximately 4.3 hours/acre/year fishing effort by bass anglers. This is well below the 30 angler hours/acre/year threshold theorized by Eder (1984) to have significant impacts on largemouth bass size

structures. This amount of effort may be even less significant considering the total bass angler release rate of 82.2% (Table 5). The remaining anglers consisted of non-specific anglers (13.8%), catfish anglers (11.9%)), bream (*Lepomis spp.*) anglers (9.5%), crappie anglers (6.1%), and all other anglers (8.2%).

Creel survey results indicate most fishing trips are 3.5 to 4.6 hours with 6,400 to 6,700 anglers traveling an average of 10 to 16 miles to reach the ramp (Table 3). Bass anglers experienced high catch rates (4.4 bass/trip) in 2007, but had low harvest rates (1.1 bass/trip, Table 4). The change may have been due in part to angler opinion in the wake of Hurricane Rita or simply the lack of bass considered to be of harvestable size ($\geq 12''$). Catch and harvest rates both declined from 2007 to 2013; however, the average weight of harvested LMB increased from 0.76 lbs to 1.16 lbs (Table 4). Total release rates were almost identical between 2007 and 2013 (82.3% and 82.2%, respectively) even though the total number of bass caught was significantly lower in 2013 (Table 5).

Table 3. Total angler number, averages of angler party size, duration of fishing trip, and distance traveled from residence to boat ramp from 2007 and 2013 Calcasieu River creel surveys.

All Anglers				
Year	Total # of anglers	Mean # of anglers in party	Mean length of fishing trip (hrs.)	Mean one-way distance traveled to ramp
2007	6695	1.73	3.52	10
2013	6460	1.77	N/A	16

Table 4. Largemouth bass caught per trip, released per trip, harvested per trip, and mean weight of harvested bass by bass anglers in 2007 and 2013 from the Calcasieu River.

Bass Anglers				
Year	# LMB caught per trip	#LMB released per trip	# LMB harvested per trip	Average weight of harvested LMB
2007	4.37	3.29	1.07	0.76
2013	2.5	2.15	0.36	1.16

Table 5. Total largemouth bass harvested, released, released below, and released above 12 inches by largemouth bass anglers in 2007 and 2013 from the Calcasieu River.

Bass Anglers				
Year	Total #LMB harvested	Total #LMB released	#LMB released below 12"	#LMB released above 12"
2007	3745	17411	13977	3434
2013	1389	6420	4896	1524

Commercial

The two fish species most commonly harvested by commercial fishermen in the Calcasieu River basin are alligator gar and blue catfish.

Species of Special Concern

Paddlefish, *Polyodon spathula*—Paddlefish have been collected during standardized big river sampling from 2002-2014 (N=17). State ranking S3: rare and local throughout the state or found locally (even abundantly at some of its locations) in a restricted region of the state, or because of other factors making it vulnerable to extirpation (21 to 100 known extant populations) Western Sand Darter, *Ammocrypta clara* has not been collected on the Calcasieu River to date in LDWF big river sampling efforts. State ranking S2: imperiled in Louisiana because of rarity (6 to 20 known extant populations) or because of some factor(s) making it very vulnerable to extirpation.

Bigscale Logperch, *Percina macrolepida*—has been collected with electrofishing during standardized big river sampling from 2002-2014 (N=26). State ranking S1/S2: critically imperiled in Louisiana because of extreme rarity (5 or fewer known extant populations) or because of some factor(s) making it especially vulnerable to extirpation, and/or imperiled in Louisiana because of rarity (6 to 20 known extant populations) or because of some factor(s) making it very vulnerable to extirpation.

HABITAT EVALUATION

Lower 15%: Approximately 26 river miles

This section of the river is estuarine and brackish marsh habitat and is subject to high salinities (5.0 to 30.0 ppt). This area is not suitable habitat for freshwater fish. For the same reason, nuisance aquatic vegetation is nonexistent.

Substrate—Silt, clay, and sand with occasional oyster reef

Vegetation—Predominately shoreline oystergrass (*Spartina spp*)

Mid 15%: Approximately 37 river miles

This area transitions from saltwater to freshwater with a wide range of salinities (0.0 to 20.0 ppt.) depending on season and locale. Navigation projects have significantly degraded freshwater habitat below the saltwater barrier by allowing ingress of high salinity water. The habitat evaluation for this portion of the river will concentrate on the area upstream of the saltwater barrier since the area below it has become predominately saline.

Spawning Habitat

As with most river systems, spawning habitat for many species varies with the spring flood pulse. High water years flood batture areas and increase connectivity with backwater swamps and marshes providing abundant habitat for nest building fish. In low water years, spawning habitat is limited to the main river channel and connected swamps and marshes. In this part of the river, there are abundant river swamps with woody debris that provide adequate spawning

area even in low flood pulse years. Overall, spawning habitat is not usually a limiting factor in fisheries production.

Juvenile habitat

Juvenile habitat for centrarchids also varies with spring rises, with high water years providing good access to flooded batture lands containing abundant woody debris cover. During low water years in the spring season, in addition to reduced flooded vegetation, higher salinities may reach this part of the river and negatively impact juvenile/egg survival of freshwater fish. Lack of juvenile habitat in low water years can reduce recruitment by forcing juvenile fish into the main river channel increasing likelihood of predation.

Adult habitat

Adult habitat varies by season, with summer and fall having the annual minimum available habitat. This portion of the river has numerous bays and connected oxbows that are excellent habitat for adult largemouth bass. However, this amount of adult habitat is limited to the normal confines of the river, and in many years cannot support the abundance of YOY fish produced during the spring flood pulse. Because of this, adult habitat is a limiting factor of fisheries production in this part of the Calcasieu River.

Fertility

Because the Calcasieu River is relatively un-impacted/un-impeded for most of the upper watershed (low head dams only), the overall fertility of the system is in a relatively natural state. This means that fertility, and therefore productivity, are dependent upon watershed fertility. Because the overall soil fertility of the Calcasieu River basin is relatively low, fisheries production is lower than more nutrient rich rivers. While this reduced carrying capacity is natural for this area, overall fertility is the primary limiting factor in fisheries production.

Problem Vegetation

The open bays and oxbows that provide quality largemouth bass habitat also provide excellent growing conditions for aquatic vegetation, primarily water hyacinth and *Salvinia spp.* Because this is an open river system, these plants are prone to movement and in most areas do not reach concentrations high enough to impact fisheries. However, because of the number of camps/homes and high usage in the area, it does generate complaints. Heavy rains wash giant salvinia (*Salvinia molesta*) out of private backwater systems and into the main channel. Problem areas are routinely treated by LDWF spray crews, on a monthly to bi-monthly basis.

Substrate

The primary substrates are silt and river sand.

Artificial structure

None

Upper 70%: Approximately 139 river miles

This stretch of river becomes shallower, narrower, with swifter moving current.

Spawning Habitat

The spring flood pulse can provide additional spawning habitat in this part of the river. However, because of the small batture area and rapid water level fluctuations, the pulse is not as beneficial to nest building fish. The shallow sandy bottom of the river provides ample spawning habitat without the flood pulse. The two low head dams may block spawning migrations for some species in low water years. Overall, spawning habitat is not a limiting factor in this part of the river.

Juvenile habitat

Juvenile habitat availability varies with water levels. Multitudes of downed trees and inundated terrestrial vegetation provide ample woody debris which is the primary cover available to juvenile fish. Juvenile habitat is not a limiting factor.

Adult habitat

The entirety of the river (bank to bank) is available as adult habitat. Adult habitat is not a limiting factor.

Fertility

This part of the Calcasieu contains the two low head dams found on the river. These dams do not impede nutrient movement under most conditions. The overall fertility of the system is in a relatively natural state. This means that fertility, and therefore productivity, are dependent upon watershed fertility. Because the overall soil fertility of the Calcasieu River basin is relatively low, fisheries production is lower than more nutrient rich rivers. While this reduced carrying capacity is natural for this area, overall fertility is the primary limiting factor in fisheries production.

Problem Vegetation

Due to the swifter currents and sandy substrate, aquatic vegetation is not problematic in this area.

Substrate

Primarily sand.

Artificial structure

None

CONDITION/IMBALANCE PROBLEM

Hydrologic alterations on the mid and lower portions of the river, primarily the Calcasieu Ship Channel, have increased salinities to the point where areas that were once freshwater habitat are now saline and no longer suitable for freshwater fish.

Problem aquatic vegetation in the middle portion of the river, primarily giant salvinia, is

impeding access and impacting backwater habitats.

Low head dams affect natural river flows, especially in low water years.

CORRECTIVE ACTION NEEDED

Where feasible, the natural hydrology of the river should be restored. Because of the importance of the Calcasieu Ship Channel to shipping interests and the local economy, removal of the ship channel is not a realistic option. The saltwater barrier was installed to prevent saltwater intrusion upstream. Other methods to reduce salinities should be examined. Feasibility and public opinion related to the removal of the low head dams on the upper portion should be examined.

RECOMMENDATIONS

- 1) Continue LDWF herbicide control efforts on the middle portion of the river. Herbicide selection and application rates will be in accordance with LDWF Aquatic Herbicide Application Protocol. Conduct three treatments of Imazapyr (0.5 gal/acre) and Turbulence surfactant (0.25 gal/acre) to maintain control of water hyacinth and alligator weed. Areas with greater than 75% hyacinth will be treated with 2,4-D (0.5gal/acre) and a non-ionic surfactant (1 pt/acre). Conduct 5 to 10 treatments for control of giant and common salvinia. A mixture of glyphosate (0.75 gal/acre) and diquat (0.25 gal/acre) with Aqua King Plus (0.25 gal/acre) and Air Cover (12 oz./acre) surfactants should be used from April 1 – October 31. Outside of that time frame, diquat (0.75 gal/acre) and a non-ionic surfactant (0.25gal/acre) should be used. Due to the variable nature of an open river system, salvinia densities can vary greatly. Treatment numbers may be higher or lower than planned based on these densities.
- 2) Continue to work with private landowners to stock giant salvinia weevils in private backwater areas outside the main channel.
- 3) Protect the relatively natural state of the river in the upper portion. This can possibly be accomplished by partnering with local state legislators to add the Allen parish segment to the scenic streams program.
- 4) Partner with local government to examine feasibility of removing existing low head dams to promote natural river hydrology and prevent blockage of spawning migrations.
- 5) Continue to assess fish stocks with standardized and big river sampling techniques.

REFERENCES

- Eder S. 1984. Effectiveness of an imposed slot length limit of 12.0 to 14.9 inches on largemouth bass. *North American Journal of Fisheries Management* 4:469-478.
- Lester, Gary D., S. G. Sorensen, P. L. Faulkner, C. S. Reid, and I. E. Maxit. 2005. *Louisiana Comprehensive Wildlife Conservation Strategy*. Louisiana Department of Wildlife and Fisheries. Baton Rouge. 455 pp.